PUBLIC EVENTS.

DURING the course of the last month, subjects of the most important nature have continued to occupy public attention.—Men of all parties looked forward to the meeting of the Imperial Parliament, with the most intense interest. The sanguine, strengthened perhaps by the recent proclation of George the IV. as King of Hanover, throwing equally open to individuals of all religious denominations, the different offices of state in his Hanoverian dominions, anticipated the removal of penal restrictions, upon account of religious tenets. The timid were led to believe, that the safety of the State required the suppression of a self-elected Body, whose intemperance and violent procedure greatly contributed to agitate the public mind. The friends of moderate measures, whilst they deprecated the violence of which the timid complained, were led to hope that the time had arrived, when the periodical tirades of the Roman Catholic Association, and the declamatory violence of Orange Societies, were, in the spirit of impartial justice, to be both superseded by the concession of the long-sought rights of the one, and the positive withholding, not merely all legislative, but even semi-ministerial approbation from the other.

The state of Ireland, as might have been expected, occupied a prominent situation in His Majesty's Speech, which we regret our limits do not allow us to insert, but which is familiarly known to our readers. From the tone of the Speech, it required little foresight to anticipate the course which His Majesty's Ministers intended to pursue. A Bill has been introduced by Mr. Goulbourn, to amend certain Acts relating to unlawful societies in Ireland, which was carried, upon its first reading, by a majority of 155,—278 voting for the Bill, and 123 against it. Upon the second reading of the Bill, the majority was 146,—253 voting for, and 107 against the Bill. Mr. Brougham's motion, that the Roman Catholic Association should be heard by Counsel at the Bar of the House of Commons, was negatived by a majority of 133,—89 voting for, and 222 against the motion. Public attention, during the last month, has thus been absorbed in one great subject; the discussion of which in Parliament has produced some of the finest displays of eloquence, that have been given for many years; resembling those that astonished and delighted the country, in the brilliant days of Pitt, Fox, and Sheridan; and showing how inexhaustible the stores of British genius are, when proper occasions occur for drawing them forth.

The recognition of the revolted Colonies of Old Spain, which have already established their independence, distinctly avowed in the King's Speech, seems equally politic and just.

PROGRESS OF THE ARTS AND SCIENCES.

RAILWAYS AND CANALS.

WE present here some miscellaneous information respecting railways and canals, which could not well be introduced in the article already given on that subject, in our present Number.

In 1799, at Measham, in Derbyshire, a horse, value £20, drew, with great ease, on a railroad, twenty-one carriages laden with coals and timber, weighing 35 tons, (long weight) on a declivity of five-sixteenths of an inch in a yard, or one in 115. He also drew with ease 5 tons up the same: and, in another place, he drew 3 tons up an acclivity of an inch and three quarters in the yard, or one in 21.

At Brinsley, in Nottinghamshire, about the same time, a horse, value £30, drew a load of 43 tons 8 hundred, (long weight,) carriages included, down a declivity of one-third of an inch in a yard, or one in 108: and he afterwards drew 7 tons up the same.

On the Penrhyn railway, which has an inclination of three-eighths of an inch in a yard, or one in 96, two horses draw twenty-four waggons, containing 24 tons, through a stage of a mile and a quarter; and perform this journey six times a day. The railway consists of five such stages; and thus ten horses convey through its whole length, 144 tons each day. The same work formerly employed 144 carts and 400 horses; so that, by means of the railway, 10 horses do as much as was formerly done by 400.

On a railway at Alloa, a horse draws readily 4½ tons of coals, on three waggons, which weigh nearly three tons additional; and such is the inclination, that he draws back the empty waggons. He can also draw, with great exertion, four such waggons similarly loaded.

In 1805, a trial was made on the Surrey railway, by Mr. Bankes, in which a horse, taken indiscriminately out of a team, drew

sixteen waggons, weighing upwards of 55 tons, for more than six miles, along a level or very slightly declining part of the railway.

The late Mr. Telford says, that on a railway, well constructed, and laid with a declivity of 55 feet in a mile, or one in 96, a horse will readily take *down* waggons, containing 12 to 15 tons, and bring back the same waggons with four tons on them.

The force which a horse can exert in drawing, may be determined by the following rule: Ascertain the two weights which he can move slowly, with equal ease, up and down an inclined plane, or railway; then divide twice the product of these weights by their difference, and the quotient by the number expressing how many times the length of the plane exceeds its height. Thus, in the first of the experiments mentioned above, the weights are 35 tons and 5 tons, or 84,000 lbs. and 12,000 lbs. Hence, dividing twice the product of these by their difference, and the quotient by 115, we get 243½ lbs. for the force exerted by the horse, supposing it to have been the same in both cases. Hence, if to this we add the quotient found by dividing 84,000 lbs. by 115, we get 974 lbs. for the whole moving force in the descent; which being about an eighty-sixth part of 84,000 lbs., we may suppose the friction and inertia to have been about one part in 86 of the whole load. The same result might be obtained by taking from 243½ lbs. the quotient found by dividing 12,000 lbs. by 115, and dividing 12,000 lbs. by the remainder.

The following theorem, which is erroneously ascribed in the *Scotsman* to Professor Leslie, was given by Euler, and was found by the experiments of Schulze to be very nearly true:—The force which a man or horse can exert with the velocity v, is $f\left(\frac{a-v}{a}\right)^2$; where a is the velocity with which the man or horse can move with the same exertion, without any load, and f the force in equilibrium, or at a *dead pull*, without motion. Thus, if a horse, unloaded, can move at the rate of 12 miles an hour, and with an equal muscular exertion can hold 144 lbs. in equilibrium, the formula will become $(12-v)^2$; and by taking v successively equal to 2, 4, 6, 8, and 10 miles, we get 100, 64, 36, 16, and 4 lbs. for the respective degrees of force which the horse can exert in drawing, with the same ease, at these rates, the rest of his strength being expended in carrying forward his own body. It is easy to show from the general formula given above, by the differential calculus, that the velocity with which the horse or man can perform the most work in a given time, with equal ease, is one-third of the velocity with which he can move when unloaded. We see from these principles, how much the steam engine is preferable to animal force, as a moving power, when considerable velocity is required, as there is only the same expenditure of force in carrying it forward in a swift motion, as in a slow.

It is calculated, that where there are considerable traffic and intercourse, the expense per mile for conveying goods on railways with steam engines, will be 2d. per ton; and the fare for passengers, a little more than a halfpenny for the same distance.

On the river Mersey, canal lighters are often detained and tossed by storms, till the goods in them are so much injured, as to be rendered unfit for exportation; and sometimes even the lighters are sunk: and the like is the case elsewhere. Railways are free from such inconveniences.

The following are quotations from a late English publication on railways and canals:—

"Water carriage cannot transmit numerous castings and apparatus, (now sent at great expense by land carriage to and from every part of the kingdom,) because the size will not pass through canal bridges or locks, and because the weight exceeds the tonnage of a single boat."....."Numerous castings and machinery are cast and made in parts, (to their consequent deterioration in value and perfection) to enable them to go by water carriage."

Z. A.

MR. BARLOW'S METHOD OF CORRECTING OBSERVATIONS MADE BY THE COMPASS IN SHIPS.

It has been found that in ships, the needle of the compass is materially affected by the iron used in the construction of the vessel. As that metal is now employed in much greater quantities than formerly in ship-building, the effect thus produced has been growing in magnitude; and, in some cases, the error is found to amount to no less than 30° or 40°, or even more. Such a source of error, without some mode of correcting it, would have rendered it necessary to continue to construct ships in the old method; and thus the important advantages must have been relinquished, in a great degree, which are known to result from the use of iron, in the construction of cables, capstans, and various other articles in ship-building.

Professor Barlow, of the Royal Military Academy at Woolwich, having instituted a series of experiments in magnetism, made several important discoveries. One of the most valuable of these is the curious fact, that *the attractive power of iron depends, not on its weight, but on its surface;* a hollow iron ball affecting the needle, as much as a solid one of the same diameter. From this property, and from the attraction being greater, the nearer the needle is placed to the attracting body, it follows that a plate of iron, of inconsiderable

weight, placed near a needle, may attract it as powerfully as large masses placed at greater distances. From this simple principle, Mr. Barlow derived the discovery of a method of effectually correcting the errors already described. This he effects, by placing a plate of iron, of twelve or fifteen inches diameter, in the line drawn from the compass to the common centre of attraction of all the iron in the vessel, or in the continuation of that line beyond the place of the compass, the position of the plate being in each case determined by experiment. In the latter of the two positions, the plate is so situated as to attract the needle with exactly the same force as all the iron in the vessel. By this means, the effect of the iron is neutralized, and the needle takes the same direction in every position of the vessel, and at all parts of the earth, as if it were influenced by no other power than the magnetic attraction of the earth. When the plate is placed *between* the compass and the magnetic centre of the vessel, it is fixed in such a position as exactly to *double the error*. Hence, the direction of the needle being observed, first when the plate is removed, and then when it is in its position, the difference will evidently be the error; and, consequently, the true direction will be known.

Such is the very simple and beautiful, and, at the same time, highly valuable discovery of Mr. Barlow. For this, he has already received from the Board of Longitude £700, the largest reward that they have it in their power, by their constitution, to bestow; but it is to be hoped, that he will yet obtain other more adequate remuneration. In the meantime, he has secured the invention by a patent; and means to supply the plates, in all seaports, with the necessary directions for using them.

In consequence of the great importance of this invention, it has been truly said, "that, if any vessel be in future allowed to go to sea, and especially to high latitudes, without the precautions so clearly pointed out by Mr. Barlow, the loss both of property and of lives, in the event of shipwreck, may, in most cases, be fairly attributable to the owners."

Z. A.

FINE ARTS.—TAPESTRY AFTER RAPHAEL'S CARTOONS.

The public has *lately* been presented, at the Egyptian Hall, London, with an exhibition full of real interest, and curious on several accounts. It consists of the *tapestry* which was executed from the Cartoons of Raphael—those splendid works which have so long been the glory of this country, and the delight and wonder of all true lovers of art. It is well known that those paintings (seven in number, and now at Hampton Court), are part of a set supposed to have originally consisted of twelve, which were executed by Raphael merely as designs, to be worked in tapestry. But it was not so generally understood that any of the tapestries themselves, which had been produced from those designs, *were in existence;* still less that *two more of them are preserved than of the original designs.*—This, however, is the case; and we have here nine of these admirable works: seven exactly corresponding with those at Hampton Court, and two, scarcely inferior in general merit, representing the Conversion of St. Paul, and the Stoning of St. Stephen.

The tapestries present most excellent representations of the original pictures—certainly much better than the oil copies of them, by Sir James Thornhill: better, because, though perhaps in some respects inferior to those copies in particular expressions, the general effect approaches nearer to that of the subdued tone of the originals.

The two tapestries, the originals of which we do not possess, are fully worthy of the place they occupy in the set; for though they are not upon the whole, so full of power, either of design or expression, as the Paul at Athens, the Elymas, and perhaps, the death of Ananias, they possess points of interest and of beauty, which even these cannot boast, because the subjects of them do not admit of it. The Conversion of St. Paul consists of a spacious landscape scene, representing the city of Damascus in the distance, with Paul and his attendants in the foreground; while the clouds are miraculously opening over head, and shewing the Saviour—whose figure and attributes are connected with the scene and persons below, by means of the *glory* which is emanating with intense brightness from about his head, and gradually decreasing in splendour till it reaches the immediate object of its revelation—Saul—who is stretched upon the ground in a paroxyism of fear and wonder. "And as he journeyed, he came near Damascus; and suddenly there shined round about him a light from heaven." "And he fell to the earth." The general effect of this scene is undoubtedly fine and impressive. But in this, as well as in the other new composition—the Stoning of St. Stephen—(still more, indeed, in this latter,) the chief interest arises from the individual expression of the various heads and figures. These, however, it would demaud a space to examine and describe, which we cannot, at present, allot to them. We must only add, therefore, that fortunately these two tapestries are among the best preserved of the whole nine; and, in the absence of the original designs, furnish a most interesting and satisfactory notion of what those designs must have been.—*N. Monthly Mag.*

MECHANICS' INSTITUTIONS.

In our preceding Number, we gave a short account of these Institutions, and spoke of them in terms of warm approbation. If, in our account, we have seemed to pass over the efforts made to accomplish this desirable object in other places, the omission is unintentional, and we shall gladly insert any particulars with which we may be supplied. One correspondent has promised us a communication on this subject; but he could not give it, with sufficient correctness, in time for our present Number. A distinction is to be made between Lectures expressly for mechanics, and those which, however accommodated to them, are open to all persons that choose to attend. Perhaps, if this distinction be kept in view, it will appear that the Lectures in Glasgow, and those given in Belfast in 1814, were the only ones of the kind, previous to the late establishments of Mechanics' Institutions. It has, however, been urged that the Lectures given in the Dublin Society for such a long series of years, and those given for the last eighteen or twenty years in the Cork Institution, as well as many courses of Lectures in England, especially those at Manchester and Newcastle, were essentially of the same nature. They were popular Lectures, of a similar description to those now given in Mechanics' Institutions, open to and often attended by *operatives;* and provided, in many instances, with *models,* especially at the Dublin Society house, for the use of which by the artisan, a special provision was often made. These may, at least, be considered as forerunners of Mechanics' Institutions; and will deserve notice. In the meantime, we remark, with pleasure, the establishment of a Mechanics' Institution in Cork, on a very extensive plan; for which, a sum of above £1250 was subscribed in a few days, without any solicitation. One object of this Institution is to have a lending Library; and, if we may judge from the success which has attended the Mechanics and Apprentice's Library in Liverpool, it is a part of the plan which is peculiarly deserving of encouragement. In Cork, we are informed that some hundreds of artisans and mechanics, or, in other words, of "*operatives,*" have given in their names as members. May we not hope that some of the respectable mechanics in Belfast will direct their attention to the subject? H.

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